Topic: Line segments, slope and midpoint

Question: Line segment.

Each pair of points below represent the endpoints of a line segment. Which pair would belong to a segment with the given slope?

$$m = \frac{3}{5}$$

Answer choices:

A $(1,2)$ and $(7,5)$

B $(-9,0)$ and $(-4,3)$

C $(-4,-1)$ and $(-10,-5)$

D $(8,0)$ and $(2,-2)$

© Krista King Math

Solution: B

Calculate the slope for each pair of points.

For answer choice A:

$$\frac{5-2}{7-1}=\frac{3}{6}=\frac{1}{2}$$

For answer choice B:

$$\frac{3-0}{-4-(-9)}=\frac{3}{5}$$

For answer choice C:

$$\frac{-5-(-1)}{-10-(-4)}=\frac{-4}{-6}=\frac{2}{3}$$

For answer choice D:

$$\frac{-2-0}{2-8}=\frac{-2}{-6}=\frac{1}{3}$$

Only answer choice B gives the desired slope.

© Krista King Math

Topic: Line segments, slope and midpoint

Question: Each pair of points in the table below represents the endpoints of a line segment. Which two segments have the same midpoint?

Segment	Point 1	Point 2
$\overline{AB}$	$(1, -3)$	$(9, 5)$
$\overline{CD}$	$(2, 4)$	$(6, -3)$
$\overline{EF}$	$(3, 0)$	$(6, 6)$
$\overline{GH}$	$(1, 1)$	$(9, 1)$

Answer choices:

A $\overline{AB}$ and $\overline{GH}$

B $\overline{CD}$ and $\overline{EF}$

C $\overline{EF}$ and $\overline{GH}$

D $\overline{AB}$ and $\overline{CD}$

© Krista King Math

Solution: A

Calculate the midpoint for each segment.

The midpoint of $\overline{AB}$:

$$(x, y) = \left(\frac{1+9}{2}, \frac{-3+5}{2}\right) = (5,1)$$

The midpoint of $\overline{CD}$:

$$(x, y) = \left(\frac{2+6}{2}, \frac{4-3}{2}\right) = \left(4, \frac{1}{2}\right)$$

The midpoint of $\overline{EF}$:

$$(x, y) = \left(\frac{3+6}{2}, \frac{0+6}{2}\right) = \left(\frac{9}{2}, 3\right)$$

The midpoint of $\overline{GH}$:

$$(x, y) = \left(\frac{1+9}{2}, \frac{1+1}{2}\right) = (5,1)$$

The two segments with the same midpoint are $\overline{AB}$ and $\overline{GH}$.

© Krista King Math

Topic: Line segments, slope and midpoint

Question: Find the position of the other endpoint.

A line segment has one endpoint at $(5,8)$ and a midpoint at $(3,2)$.

Answer choices:

A $(7,14)$

B $(9,0)$

C $(0,-6)$

D $(1,-4)$

© Krista King Math

Solution: D

Use the midpoint formula.

$$\text{midpoint} = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$$

We know one endpoint is $(5,8)$ so let $x_1 = 5$ and $y_1 = 8$.

The midpoint is $(3,2)$, so

$$\left(\frac{5 + x_2}{2}, \frac{8 + y_2}{2}\right) = (3,2)$$

Separate the x and y terms and solve for x_2 and y_2.

$$\frac{5 + x_2}{2} = 3$$

$$5 + x_2 = 6$$

$$x_2 = 1$$

and

$$\frac{8 + y_2}{2} = 2$$

$$8 + y_2 = 4$$

$$y_2 = -4$$

Putting these values together, we can say that the missing endpoint is $(1, -4)$.

© Krista King Math